

ERIOPHYID STUDIES C - 5

REVISION OF TYPES OF ERIOPHYES AND PHYTOPTUS

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The names Eriophyes von Siebold, and Phytoptus Dujardin, are two of the most important and basic designations used for Eriophyoid mites, due mainly to the publications of Alfred Malepa. According to A. C. Oudemans, in his Critico-Historical Survey of Acarology III, p. 1270, 1937, Eriophyes was published not later than March 1851. On this same page Oudemans dates Phytoptus as July 1851.

Examination of the currently employed genotypes for these generic names shows that they, the genotypes, do not conform to the rules set forth in the 1964 edition of the International Code of Zoological Nomenclature. We wish to preserve names Malepa used and are therefore here publishing genotypes for these genera that will establish them on the correct bases. These new genotypes perforce change the recent usage of the names in question to new uses. These changes inevitably cause some confusion and create certain vacancies. We are proceeding to fill vacancies, and look forward to eventual end of confusion.

Code provisions employed for new settings are, first, Article 16(a)(viii), which directs that the naming of an animal based on a description of the work of that animal establishes the name of the animal. (We deplore this provision as it tends to lower the quality of taxonomy) Second, Article 69 (a), stating that the type of a genus must be chosen from the first specific name or names published binomially with the respective genus name. Supplementary explanations follow each genotype setting below.

ERIOPHYES von Siebold, Jahresb. Schles. Ges. 28:89, 1851

Type of Eriophyes - labiatiflorae F. Thomas 1872, Zeitschr. für Gesam. Naturwis. n. s. 39:459

Host of type - Origanum vulgare L., the mite causing yellowing of the tips, especially the flower heads, and growth of excessive hair.

Synonym of Eriophyes - **ACERIA** Keifer 1944, Bul. Cal. Dept. Agr. 33(1):22

Type of Aceria - tulipae K., Bul. Cal. Dept. Agr. 27:185, 1938

The genotype of Eriophyes, labiatiflorae, which is the genotype by monotypy, then confers the following characters onto Eriophyes: wormlike body with thanosomal rings subequal dorsoventrally. Bostrum of moderate size, containing short formoral stylet. Cephalothoracic shield with two setae which arise from dorsal tubercles on rear shield margin and direct setae caudad, usually divergently. Legs and coxae with all standard setae including foretibial seta; forecoxae separated by sternal line. All standard thanosomal setae present. Telosomal setae present; accessory setae usually present. Female genitalia with anterior internal apodeme of moderate length; spermathecae subglobular and appended from short tubes that arise from central opening at rear of genitalia, the tubes either projecting laterally or diagonally to rear.

These structures are the same as were used in establishing Aceria as a genus.

In the article by Fredreich Thomas referred to above there was, among other things, a discussion of the origanum mite, following his examination of Bremi-Wolff's specimens of dry plant parts damaged by this Eriophyid. Thomas at the time questioned Bremi's host identification. (Bremi was deceased by then.) We accept Bremi's plant name, as indicated above.

In 1889 Nalepa named the origanum mite as Phytoptus origani Nal. Later he synonymized origani under thomasi. The host of thomasi is Thymus serpyllum L. After examining Nalepa's description and figures of origani we conclude that origani is a species distinct from thomasi.

Since Thomas' description of the plant damage connected with the name labiatiflorae is recognizable, that validates the specific name. Thomas published the name as Eriophyes labiatiflorae Bremi, copying Bremi's manuscript, but since Thomas published the name he receives the credit. The validity of the description of damage in this case is attested to by Dr. C. W. Sabrosky, a member of the Editorial Committee for the Code, XV International Congress of Zoology.

Prior to 1938 no type had been set for the genus name Eriophyes. Keifer, in 1938, designated the species vitis Pagenstecher as the genotype, Bul. Cal. Dept. Agr. 27(3):301. But vitis, the grape erineum mite, had not been placed as one of the species first published binomially under Eriophyes, and as vitis actually has few near relatives (see below), the elimination of vitis as the type of Eriophyes is not only correct according to the Code, but is also helpful in arranging a logical structural grouping of species in the Eriophyidae.

As a result of this action some of the specific names recently quoted under Aceria move to or revert to positions under Eriophyes. Examples of these names are: aloinis K., aloe wart mite; caryae K., pecan leaf edgeroller; caulis Cook, black walnut petiole gall mite; cynodontiensis (Sayed), Bermuda grass node mite; erineus (Nal.), walnut erineum mite; ficus Cotte, fig bud mite; granati (C. & M.), pomegranate leaf roll mite; guerreronis (K.), coconut flower mite; hibisci Nal., hibiscus erineum mite; litchii K., litchi erineum mite; lycopersici Wolfen., tomato erineum mite; mangifera Sayed, mango bud mite; querqi (Garman), oak erineum mite; sheldoni Ewing, citrus bud mite; tenuis (Nal.), grass sheath mite; tristriatus (Nal.), Persian walnut blister mite; tulipae K., wheat curl mite; ulmicola (Nal.), elm leaf gall mite.

PHYTOPTUS Dujardin 1851, Ann. Sci. Nat. S. 3, Zool. 15:155

Type of genus - tiliae Pagenstecher, Verh. Ver. Heidelberg 1:46, 1857

Host of type - Tilia platyphyllos Scop. The mite makes the well-known nail galls on the upper leaf surface. The name, tiliae, was among four names that were the first binomials published under the genus name Phytoptus.

Synonym of Phytoptus - PHYTOCOPTES Donnadieu, Ann. de las Soc. Linneenne 26:153-155, 1876

Type of Phytocoptes - gallarum Don., the phase of the name chosen is the one making nail galls on Tilia.

This selection of tiliae Fgst. as the genotype of Phytoptus brings this genus name back into the Eriophyidae (in a restricted sense), and places it in the subfamily Eriophyinae. (As has been seen, Eriophyes has chronological priority over Phytoptus.) The definition of Phytoptus is now exactly the same as that of the recent usage of Eriophyes (when the type was vitis). With the type as tiliae Phytoptus now differs from Eriophyes by having the dorsal shield setae arising from tubercles more or less ahead of the rear shield margin, and the setae directed up or ahead.

Keifer, 1938, set avellanae Nalepa, as the type of Phytoptus. The filbert big bud mite, avellanae, has extra setae on the shield and abdomen, and is therefore not closely related to tiliae Fgst. While avellanae was considered to be the type of Phytoptus it placed that name in another group removed from Eriophyes. But since avellanae was not among the first names published binom-

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ially under Phytoptus it is ineligible as the type. This revision leaves a vacancy as regards a generic name for avellanae and congeners. A new genus name is provided below.

The name Phytocoptes has had a curious history. It originated in an 1869 article by F. Thomas, in which he suggested that Phytocoptes would have been a better way to compose the name for these mites than was Phytoptus. Donnadieu was first to publish Phytocoptes binomially and so he receives credit for it. Actually Donnadieu assigned Phytocoptes to the Tetranychidae, believing that certain eight-legged mites in this family had four-legged larvae in leaf galls. He recognized increase in populations in the galls but explained it as larval reproduction. However, Tetranychidologists persist in ignoring the name and the assignment. As far as Eriophyids are concerned the synonymy established here takes care of the name.

Nalepa's version of the name began in 1891 when he declared that Donnadieu's name did not exist, and described Phytocoptes dubius Nal., new genus and new species. Whenever Nalepa's version of Phytocoptes is listed the species name dubius must accompany it as dubius is the genotype by monotypy. Then Nalepa abruptly abandoned Phytocoptes, quoting dubius under Phyllocoptes from then on.

The grass mite dubius is a wormlike species with a prominent anterior shield lobe over rostrum, and with thanosomal microtubercles present as beads on the ring margins. The species is further characterized by a line arching across in front of the dorsal shield tubercles. It is otherwise similar to the grass mite mckenziei K., which is the genotype of Aculodes. The name for Nalepa's species preferred here is Aculodes dubius (Nal.)

With the moving of Phytoptus into the Eriophyoid family Eriophyidae, a number of names of Eriophyids of interest and of economic importance change from their present position in Eriophyes to positions under Phytoptus. Some of these species are as follows: emarginatae (K.), bitter cherry finger gall mite (very similar to padi Nal.); heteromeles (K.), toyon bud mite; laevis Nal., alder bead gall mite; lionotus Nal., birch bead gall mite; insidiosus (W. & K.), peach mosaic vector mite; prunideissae (K.), choke cherry bud mite; pseudoinsidiosus (Wilson), a pear blister mite; pyri Fgst., pear leaf blister mite.

With the removal of Phytoptus from the Eriophyoid family with the most residual setae, two vacancies occur. These are: first, the genus that Phytoptus stood for when avellanae was supposed to be the genotype no longer has a name. Second, removal of Phytoptus from the family with these extra setae, recently known as the Phytoptidae, leaves it without a family name. To fill these vacancies we establish the following two names.

PHYTOCOPELLA Newkirk and Keifer, new genus name

Body wormlike, with thanosomal rings subequal dorsoventrally. Rostrum of moderate size, containing short-form oral stylet. Cephalothoracic shield not projected over rostrum and with four setae: an anterior pair, each of which located near antero-lateral edge; dorsal seta pair arising from tubercles set ahead of rear shield margin; dorsal setae projecting up if short, ahead if long. Legs with all standard Eriophyoid setae, including the froetibial seta; usually with apico-lateral foretibial spur. Featherclaws simple, of moderate size. Coxae with three pair of setiferous tubercles; forecoxae separated by sternal line. Thanosome with three standard sublateral seta pairs and a pair of anterior subdorsal setae. Telosome with standard setae; accessory setae prominent. Female genitalia with internal apodeme of moderate length; spermathecae long-oval, attached to short tubes that project diagonally ahead from rear central genital opening, and then recurve.

Type of genus - corniseminis Keifer, Bul. Cal. Dept. Agr. 28:144, 1939

Host of genotype - Cornus nuttalli Aud., western flowering dogwood. The mites living in buds or among late summer seed clusters.

Range of genus - holarctic and probably farther.

NALEPELLIDAE Newkirk and Keifer, new family name

Description of family - body of various shapes depending on habitat adaptation: bud mites and the few gall mites wormlike; leaf vagrants and rust mites with more or less overhanging anterior lobe from shield, the body robust, or fusiform-flattened. Rostrum of various sizes, often large, always containing short-form oral stylet. Cephalothoracic shield always with one or two anterior setae; dorsal seta pair situated farther back on shield, usually present, rarely reduced or absent; dorsal setae usually pointing up or ahead, but on some genera pointing to rear. Legs with all standard Eriophyoid setae, including foretibial seta; apico-lateral foretibial spur usually present; featherclaws simple, of moderate to large size. Coxae with standard three pair of setiferous tubercles; sternal line separating forecoxae present or absent. Thanosomal rings subequal dorsoventrally on wormlike abdomens, more or less divided laterally into tergites and sternites on free-living species. Telosoma with standard setae; accessory setae tending to be large. Female genitalia with internal apodeme of moderate length anteriorly; spermathecae oval to long-oval, attached to tubes either short, or unusually long, the tubes projecting diagonally ahead from rear central genital opening, then recurving.

Type genus - Nalepella Keifer, Bul. Cal. Dept. Agr. 33:21, 1944

Members of the Nalepellidae have moved into about all of the available habitats that these four-legged mites can occupy, and have structurally become adapted accordingly. Their extraresidual setae presumably make them the most primitive of the three families. Nalepellids are not strong gall formers. This would suggest that microenvironments aside from the interior of galls may have had a considerable influence on the evolution of form that these mites show.

Key to Eriophyoid Families

1. Rostrum large in comparison to body, abruptly bent down near base, tapering; oral stylet inside rostrum of the long form. Dorsal setae present or absent; when present always pointing forward in some degree. These mites are all leaf vagrants or weak rust mites - - - - - **RHYNCAPHYTOPTIDAE**
1. Rostrum of various sizes but not abruptly bent down near base; oral stylet always of the short form. Dorsal setae various, present or absent - - 2.
2. One or two anterior shield setae; internal female spermathecal tubes long or short, but when short extending anteriorly first from central rear genital opening, and then recurving to rear. Lateral foretibial spur usually present. Anterior subdorsal thanosomal seta pair often present. These mites are bud mites, rust mites, grass sheath mites, less often gall mites, never erineum mites - - - - - **NALEPELLIDAE**
2. Only two or no shield setae, never with anterior shield setae. Internal spermathecal tubes always short and extending laterally, or diagonally to rear from central opening. Never with foretibial spur or subdorsal abdominal setae. These mites the only erineum makers. Many are gall mites; also bud mites, severe rust mites, leaf vagrants - - - - - **ERIOPHYIDAE**

Key to subfamilies of the Nalepellidae

1. Elongate wormlike mites with genitalia removed caudad from coxae by 12 to 16 unconstricted rings; abdominal rings subequal dorsoventrally; four cephalothoracic shield setae present, rear pair pointing caudad; spermathecal tubes short - - - - - **Novophytoptinae** Roivainen 1953
1. Genitalia relatively close to coxae, separated by a few more or less constricted rings; thanosome variable, the mites being either wormlike, with rings subequal dorsoventrally, or with robust bodies, or with tergal-ster-

- nal differentiation shown by rings; one or two anterior shield setae - 2.
2. One central anterior shield seta; dorsal seta pair present or absent; internal female spermathecal tubes 3 to 5 times or more longer than spermathecae. Bodies either wormlike and with subdorsal thanosomal seta pair, or more robust and fusiform and lacking these subdorsal setae - -
- - - - - **Nalepellinae** Roivainen 1953
 2. Four shield setae, rear pair rarely minute; spermathecal tubes short - 3.
 3. Body wormlike, with abdominal rings subequal dorsoventrally; rear pair of shield setae pointing up if short, ahead if long; subdorsal abdominal seta pair present - - **Phytocoptellinae** Newkirk and Keifer, new subfamily name
 3. Body more fusiform and often flattened; abdominal rings divided laterally into broader dorsal tergites and narrower sternites; subdorsal anterior abdominal seta pair present or absent - - - **Sierraphytoptinae** Keifer 1944

Tribes of the Nalepellinae -

Trisetacini Newkirk and Keifer, new tribe. Characterized by having anterior subdorsal abdominal seta pair present; most species wormlike. Contains the genera Trisetacus Keifer 1952, with three shield setae; Boczekella Farkas 1965, with one central anterior shield seta present, the dorsal setae absent. Described as having a more robust body.

Nalepellini Newkirk and Keifer, new tribe. Characterized by lacking subdorsal abdominal seta pair. Contains the genera: Setoptus Keifer 1944, which is more wormlike; Nalepella Keifer 1944, with robust species showing variation in tergal-sternal differentiation; Phantacrus Keifer 1965 with a single species having large dorsal thanosomal lobes.

Tribes of the Sierraphytoptinae -

Sierraphytoptini Newkirk and Keifer, new tribe. Characterized by having subdorsal abdominal setae. Contains the genera: Prothrix Keifer 1965, the shield setae moved to front part of shield; Austracus Keifer 1944, a gall-making species with a more cylindrical body; Sierraphytoptus Keifer 1939, a flattened leaf vagrant.

Mackiellini Newkirk and Keifer, new tribe. Lacks subdorsal abdominal setae. Included genera: Mackiella Keifer 1939 on date palm, dorsal setae pointing ahead; Retracrus Keifer 1965, a blotch mite on Chamaedorea palms, dorsal setae pointing caudad. This tribe contains subfamily Mackiellinae by Keifer 1944, and Channabasavanna 1966.

Key to the subfamilies of the Eriophyidae

1. Tibiae reduced or completely fused with tarsi; foretibia never with a seta - 2.
1. Tibiae always amply distinct from tarsi; foretibial seta nearly always present except in a few genera - - - - - 3.
2. Spatulate or shovel-shaped appendages present on either rostral termen or on foretarsi; legs which lack spatulate appendages very stout, segments shortened or combined; featherclaws very large - - **Aberoptinae** Keifer 1966
2. Lacking spatulate appendages for burrowing; less stocky legs; forecoxae often fused across center line, sternal line often absent or faint; first setiferous coxal tubercle usually absent; featherclaws relatively small -
- - - - - **Nothopodinae** Keifer 1956
3. Genitalia, especially female genitalia, noticeably projecting from thanosomal venter, appressed to coxae, usually separating coxae more than normal; anterior internal female apodeme bent up and appearing shortened, often present as heavy transverse line in ventral view; ribs of female

genital coverflap typically in two ranks; forecoxae usually narrowly connate at center line, sternal line usually short; coxae, especially forecoxae, with curved lines outlining produced coxal setiferous tubercles. Most genera in this group lack dorsal tubercles and setae - - - - -

- - - - - **Cecidophyinae** Keifer 1966

3. Genitalia lying more on level with thanosomal venter; genitalia not appressed to coxae and coxae not unusually spread; sternal line most often strong; anterior internal female apodeme extending moderate distance forward; coxae often ornamented with granules, curved lines when present not as strong; female genital coverflap various, ribs less often in two ranks; dorsal setae rarely absent from cephalothoracic shield - - - - - 4.
4. Body wormlike; thanosomal rings subequal dorsoventrally, at least on anterior half or two thirds; shield typically without anterior lobe, or with slight lobe over rostrum base; if anterior shield projection extends any distance over rostrum, then the projection is narrow and basally flexible and combined with narrow thanosomal rings - - - - - **Eriophyinae** Nalepa 1898
4. Body more fusiform and fitted for exterior living; shield usually with broad-based and rigid anterior lobe over rostrum; thanosome typically divided laterally into **broad**er dorsal tergites and narrow sternites; if no anterior shield lobe present, or a slight one, then tergal-sternal division present, or at least definitely larger microtubercles present dorsally; if tergal-sternal differences absent, then broad, rigid anterior shield lobe present over rostrum - - - - - **Phyllocoptinae** Nalepa 1898

The grape leaf erineum mite, vitis Pagenstecher 1857, has been variously quoted in Phytoptus and in Eriophyes. It however has genital and coxal structures that take it to the Cecidophyinae in the above subfamily key. But it belongs to the section of that subfamily which has genera possessing dorsal shield setae. On vitis these shield setae point up and forwards. For these reasons we establish the following new genus to receive a limited number of Eriophyids, which includes vitis.

COLOMERUS Newkirk and Keifer, new genus

Wormlike mites with thanosomal rings subequal dorsoventrally and completely microtuberculate. Cephalothoracic shield obtusely angled anteriorly, lacking an anterior projection over rostrum base; dorsal tubercles set slightly ahead of rear shield margin, usually with longitudinal axes, directing dorsal setae up and ahead in some degree. Rostrum short and with short-form oral stylet. Forecoxae somewhat spread apart more than normal, with moderate or short sternal line between; all three setiferous coxal tubercles present. Legs with all standard setae, including foretibial seta; featherclaw simple. Thanosome tapering to telosome; accessory setae absent from known species. Female genitalia somewhat appressed to coxae, produced from venter; coverflap with ribs in uneven double rank; internal female apodeme always shortened in ventral view, but somewhat variable (transverse in genotype). (Genus name: colo - short and merus - part.)

Genotype - gardeniella Keifer, Eriophyid Studies (Cal. Dept. Agr.)

B-12:9-10, 1964

Host of genotype- Gardenia jasminoides Ellis, the mites in petiole bases.

Three species can be assigned to Colomerus at present, and differ according to the following synopsis -

1. Shield lines composed of granules, especially laterally; no evident ocellar spot near lower lateral shield angle; coxal sternal line weak but curved coxal lines also weak; in erineum on Holodiscus microphyllus Rydb. - - - - - holodiscus Keifer 1970

1. Shield lines solid; ocellar spot on shield above rear lateral angle; coxal sternal line of moderate length, not weak; curved lines around second setiferous coxal tubercles strong - - - - - 2.
2. Numerous longitudinal lines on shield, especially laterally; longitudinal ribs on female genital coverflap in two uneven ranks, but both ranks of equal strength; internal female genital apodeme shortened but not resting on lateral arms of apodeme; erineum mite on Vitis spp.- vitis Fgst., 1857
2. Lateral lines on shield shortened and outcurved; anterior rank on female genital coverflap faint; internal female anterior apodeme transverse, resting on lateral support arms; bud mite on gardenia - gardeniella K., 1964

Key to the Genera of the Cecidophyinae

1. Dorsal setae absent - - - - - 2.
1. Dorsal shield setae present - - - - - 8.
2. Wormlike bud mites with very small or no anterior shield projection over rostrum base - - - - - Cecidophyopsis Keifer 1959
2. More or less broad and rigid anterior shield lobe over rostrum - - - - 3.
3. Foretarsal claw situated below featherclaw - - - - - Dechela Keifer 1965
3. Claw and featherclaw on foreleg in normal position, the claw higher - 4.
4. Broad dorsal thanosomal longitudinal trough; tergites almost as numerous as sternites - - - - - Glyptacus Keifer 1953
4. Dorsum of thanosome evenly transversely arched - - - - - 5.
5. Tergites more nearly as numerous as sternites and completely microtuberculate - - - - - Cecidophyes Nalepa 1889
5. Thanosomal tergites much broader than sternites and with no microtubercles - - - - - 6.
6. Tergites gradually narrowing to telosome - - - - - Coptophylla Keifer 1944
6. Thanosomal tergites much broader than telosomal rings - - - - - 7.
7. First tergite separate from rear shield margin- Achaetocoptes Farkas 1961
synonym- Pseudojohnella Keifer 1961
7. First tergite fused with rear of shield - - - - - Johnella Keifer 1959
8. Body robust-fusiform and strongly tapering; shield with broad-based anterior lobe; dorsal setae projecting to rear - - - - Gammaphytophtus Keifer 1939
8. Body wormlike, no anterior shield projection; thanosomal rings subequal dorsoventrally - - - - - 9.
9. Dorsal setae projecting ahead - Colomerus Newkirk and Keifer, new genus
9. Dorsal setae projecting to rear - - - - - Cosetacus Keifer 1966

In 1889 Nalepa described an alder rust mite as Acanthonotus heptacanthus, new genus and new species. Thus heptacanthus became the genotype of Nalepa's taxon by monotypy. Learning that Acanthonotus had been preoccupied in fishes since 1801, Nalepa published a short announcement in the 1890 issue of the Vienna Academy Anzeiger in which he introduced the name Tegonotus for several rust mites. This announcement includes a brief description of the genus Tegonotus, and a short list of species which he referred to Tegonotus. These species are: serratus n. sp., fastigatus n. sp., trouessarti n. sp., heptacanthus Nal., and carinatus n. sp. Tegonotus is, in this article in the Anzeiger, the replacement for Acanthonotus in the Eriophyidae.

According to the Code of Zoological Nomenclature, Article 67 (1), a name for a genus which replaces an ineligible name, must take the same genotype as

the one which the ineligible name had. Thus heptacanthus becomes the genotype of Tegonotus Nalepa.

Nalepa first differentiated his new genus Oxypleurites in a key to genera on p. 868 in Vol. 58 of the Denkschriften of the Vienna Academy, 1891. But this key fails to mention any included species. However, Nalepa's definition of Oxypleurites, and his subsequent use of the name to include species of which heptacanthus was always one, indicates that he had, in his own mind, segregated Oxypleurites from Tegonotus for the purpose of defining rust mites that possessed more or less sharp lateral tergal projections. But what he had actually done was to fasten the name Tegonotus onto these species for which he erected Oxypleurites.

This synonymy of Oxypleurites under Tegonotus leaves the taxon for which Nalepa used the name Tegonotus, without a name. We are proceeding to fill this vacancy with the following name.

NEOTEGONOTUS Newkirk and Keifer, new genus name

Fusiform leaf vagrant mites with thanosomal tergites having a middorsal ridge, but lacking lateral tergal projections. Rostrum of moderate size, projecting down; enclosing short-form oral stylet. Cephalothoracic shield with moderate-size rigid anterior lobe over rostrum; dorsal tubercles located near rear shield margin and projecting dorsal setae to rear, subparallel. Legs with all standard setae, including foretibial seta. Coxae with three standard setiferous tubercles; strong sternal line between forecoxae. Thanosome divided laterally into broader tergites, and narrower sternites; a rather deep cleft between rear shield margin and first tergite (first tergite projected up higher than following tergites on genotype). Thanosome with three standard sub-lateral seta pairs. Telosome not contrasting abruptly with rear of thanosome; telosomal seta present; accessory seta present. Female genital cover-flap with longitudinal ribs; internal anterior apodeme extended a moderate distance forward.

Type of genus - fastigatus (Nal.), Zool. Jahr. 6:332, 1892

Host of genotype - Acer campestris L., associated with other rust mites.

Nalepa's illustrations in the Zoologische Jahrbücher clearly show the deep indentation between the shield and first tergite. A key to some of the genera in this immediate group is as follows -

1. Tergites with lateral extensions more or less tooth-like or spine-like; dorsal setae variously placed on shield, on the genotype (heptacanthus) situated ahead of rear shield margin - - - - - Tegonotus Nalepa 1890
1. Tergites laterally subparallel with body, not projecting - - - - - 2.
2. Several tergites on middorsal thanosomal ridge projecting irregularly up; dorsal tubercles on rear shield margin - - - Tegoprionus Keifer, 1961 (genotype - dentatus Nal. 1891)
2. No more than first thanosomal tergite projecting up higher than others-3.
3. First tergite behind shield projecting up above subsequent tergites; dorsal tubercles very near rear shield margin and projecting dorsal setae to rear - - - - - Neotegonotus Newkirk and Keifer, new genus name
3. All tergites on thanosome on same level; dorsal tubercles on rear shield margin - - - - - Tegolophus Keifer, 1961 (genotype - califraxini Keifer, 1933)

Key to Subfamilies and Genera of the Rhyncaphytoptidae

1. Featherclaw simple, that is, undivided - Rhyncaphytoptinae Roivainen, 1953
type genus- Rhyncaphytoptus Keifer-2.
1. Featherclaw divided - Diptilomiopinae Newkirk and Keifer, new subfamily
type genus- Diptilomiopus Nal. - 7.
2. All leg setae present - - - - - 3.
2. Femoral seta absent, at least on foreleg - - - - - 6.
3. Tergites all of same height dorsally and with no lateral points - - - - 4.
3. Tergites uneven on dorsum, or with lateral points - - - - - 5.
4. Tergites wider than sternites - - - - - Rhyncaphytoptus Keifer, 1939
type - ficifoliae K. 1939
4. Tergites and sternites of even width - - - - - Rhinophytoptus Liro, 1943
type- concinus Liro, 1943
5. Tergites uneven on midridge, no lateral points - - Quadracus Keifer, 1944
type- urticarius (C.&M.), 1893
5. Tergites even dorsally, but with lateral points - Peralox Keifer, 1962
type- insolita K., 1962
6. Dorsal shield setae present - - - - - Catarhinus Keifer, 1959
type- tricholaenae K., 1959
6. Dorsal setae absent - - - - - Asetacus Keifer, 1952
type- madronae K., 1952
7. Dorsal shield setae missing - - - - - 8.
7. Dorsal setae present - - - - - 9.
8. Patella absent - - - - - Diptilomiopus Nalepa, 1917
type- javanicus Nal., 1917
synonym- Sectipes Keifer, 1962
8. Patella present; patellar and femoral seta absent from both legs - -
- - - - - Rhynacus Keifer, 1951
type- arctostaphyli K., 1938
9. Forefemoral seta represented as present; extra long shield projection over
rostrum - - - - - Bacculacus Boczek, 1961
type- kaweckii Boczek, 1961
9. Forefemoral seta absent - - - - - 10.
10. Middorsal ridge divided for short distance behind shield - - - -
- - - - - Trimeroptes Keifer, 1951
type- aleyrodiformis K., 1940
10. Middorsal ridge simple, that is, undivided - - - - - 11.
11. Filament projecting from front of anterior lobe - - - - -
- - - - - Acarhynchus Keifer, 1959
type- filamentus K., 1959
11. Anterior shield lobe lacking a filament - - - - - 12.
12. Two transverse grooves across rear part of shield - - Dialox Keifer, 1962
type- stellatus K., 1962
12. Rear shield margin making more or less of a transverse groove - - - 13.
13. Dorsal and lateral ridges thickened for wax production - - - - -
- - - - - Apodiptacus Keifer, 1960
type- cordiformis K., 1960

13. Abdominal ridges of normal thickness but some species produce flocculent wax - - - - - Diptacus Keifer, 1951
type sacramentae K., 1939

Two generic names remain enigmatic. One is Nalepa's genus Phyllocoptyches. The genotype is gallicolus. This genus appeared in Marcellia 18:190, 1922. The host is stated to be Ulmus pedunculata Foug. Nalepa gave three significant characters for this freeliving mite, which are: the rostrum is large and bent down (as on Rhyncaphytophagids), the tergites are more numerous than the sternites, and, third, the abdominal rings lack microtubercles. This latter feature would seem to make the mite a deutogyne. However, Nalepa did not list any other species on Ulmus pedunculata with which to connect this mite.

The second generic name which is unresolved is Banks' Cecidobia, described in the Proc. Ent. Soc. Wash. 7:141, 1905. The type of the genus is salicicola, which was sent to Banks by T. D. A. Cockerell. The figure of this mite is to a considerable extent fanciful, but Banks indicates that the species has an anterior lobe filament, as does Acarhynchus Keifer. Specimens received from Cockerell in the 1950's, before his death, which he kindly collected on willow at the same locality where he found Banks' salicicola, proved to be a member of the complex of willow gall mites that belong to Nalepa's tetanthrix. These mites have no anterior filament. So the enigma surrounding the genus Cecidobia Banks, persists.

REFERENCES IN THE REVISION OF GENOTYPES

- Channabasavanna, G. P. - Univ. Agr. Sci., Hebbal, Bangalore, p.40, 1966
Farkas, H. K. - Acta Zool. Acad. Sci. Hungary 7(1-2):73, 1961
Keifer, H. H. - Bul. Cal. Dept. Agr. 27:308, 1938
28:148, 1939
33:18, 1944
34:137, 1945
47:273, 1959
Ann. Ent. Soc. America 52:650, 1959
Eriophyid Studies (Cal. Dept. Agr.) B-11:19, 1964
B-13:3, 1965
B-21:19, 1966
Nalepa, A. - Das Tierreich, 4 Lieferung (Acarina), Berlin, 1898
Roivainen, H. - Ann. Ent. Fennica 19(2):83-87, 1953
Thomas, F. - Zeitschr. für Naturwis., Halle a. S. 33:313-366, 1869
(the comment on Phytocoptes)

This is the end of the joint article by R. A. Newkirk and H. H. Keifer

Note - R. A. Newkirk is an employee of the U. S. Department of Agriculture in Washington, D. C.

Eriophyes richensi Keifer, new species

Plate 1

This new species makes tiny bead galls in leaves of its elm host that project about equally from both leaf surfaces. The gall opening is on the leaf undersurface. I take pleasure in naming this mite for Dr. R. H. Richens, of the Commonwealth Bureau of Plant Breeding and Genetics, Cambridge, England, who sent it to me, and who has submitted many elm Eriophyids. Perhaps the closest relative of *richensi* is *parulmi* (K.). This latter mite makes finger galls on various elm species in North America. *Eriophyes parulmi* has a 5-rayed featherclaw, in company with *richensi*, but it has central shield lines and lateral shield granules, and the microtubercles are elliptical. In contrast the new species lacks a shield pattern, the microtubercles are weaker, and subquadrate, the coxae lack granules, and the genital coverflap has a weak transverse line or band.

Female 160 μ -185 μ long, 50 μ -56 μ thick, wormlike; color in life probably light yellowish. Rostrum 20 μ long, projecting diagonally down; antapical seta 3.5 μ long. Shield 28 μ long, 38 μ wide, subtriangular in anterior outline and with only a slight anterior extension of the shield over rostrum base; shield design lacking except for quadrate granules at lateral angles. Dorsal tubercles 25 μ apart; dorsal setae 30 μ long, projecting divergently to rear. Foreleg 25 μ long; tibia 5 μ long, with 4 μ seta at 1/2; tarsus 6.5 μ long; claw 7.5 μ long; featherclaw 5-rayed. Hindleg 23 μ long, tibia 4 μ long, tarsus 6 μ long, claw 7.5 μ long. Coxae unornamented; sternal line rather short and weak; first setiferous coxal tubercles ahead of second and ahead of anterior end of sternal line; second setiferous coxal tubercles well ahead of third. Thanosome with about 35 rings; microtubercles subquadrate, flattened, tending to be fainter or absent to rear, especially dorsally. Lateral seta 16 μ long, on ring 5 to 6 behind shield; first ventral thanosomal seta 60 μ long, on ring 13; second ventral seta 6 μ long, on ring 23. Telosome with six rings which are devoid of microtubercles; telosomal seta 21 μ long. Accessory seta 2 μ long. Female genitalia 20 μ wide, 13 μ long; coverflap with rather faint transverse marks, especially a band across center; genital seta 16 μ long.

Type locality: Patal, Baja Venipars, Guatemala

Collected: Mar. 3, 1945, by A. J. Sharp, and sent by Dr. R. H. Richens

Host: Ulmus mexicana Planch

Relation to host: the mites make very small bead galls that project evenly from each leaf surface, with opening below.

Type material: a type slide, so designated, with the above data, and sent to Dr. Richens

a paratype slide, sent to the Entomology Research Division,
USDA, Beltsville, Maryland

three paratype slides retained by the writer.

a dry leaf with galls from which the slides were made.

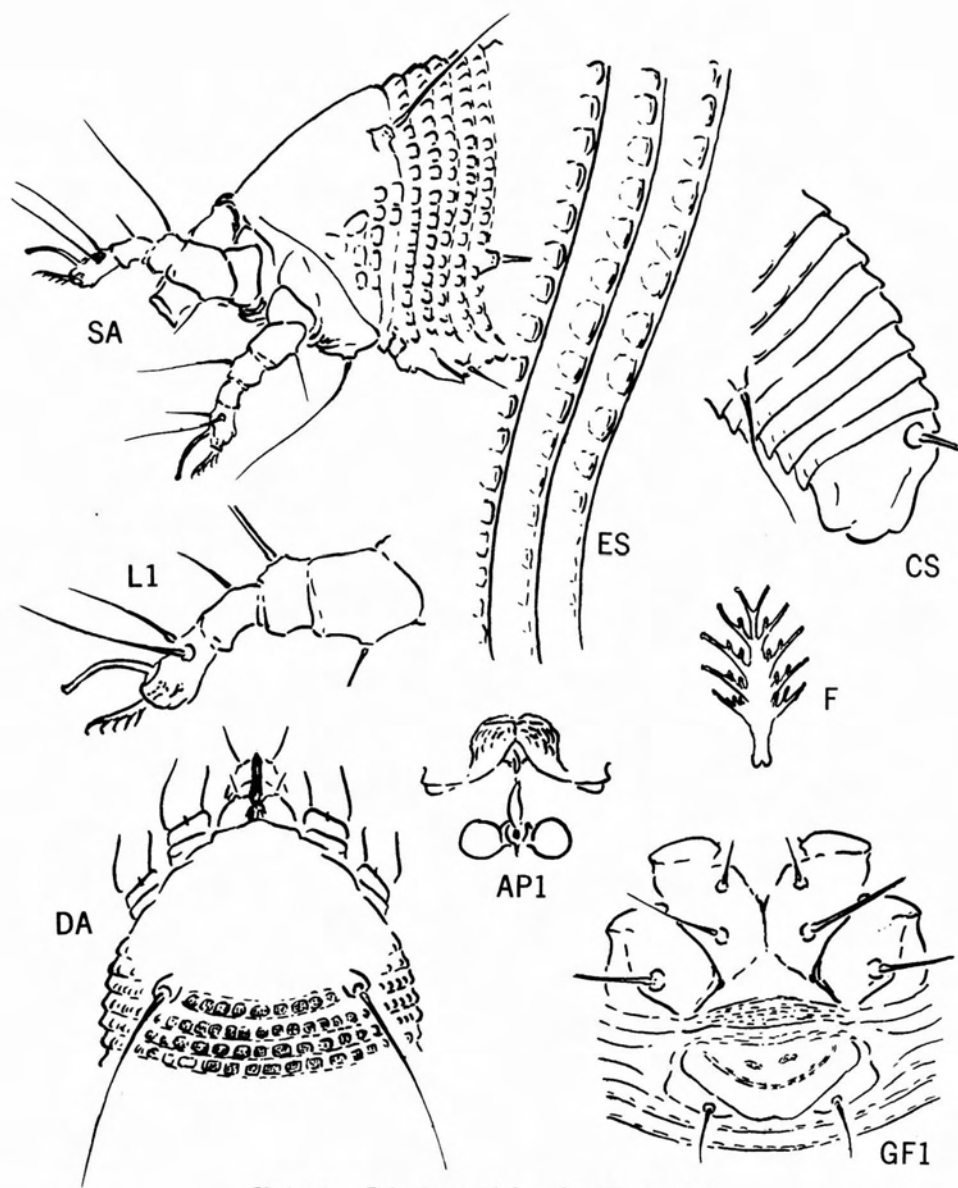


Plate 1 - *Eriophyes richensi*, new species

Aculops bassiae Keifer, new species

Plate 2

Distinguishing features of this species are: the eight-rayed featherclaw; microtubercles beadlike, and lying along ring margins; clear shield lines with median line sinuate; wide female genitalia; strongly downcurved claws. Eight rayed featherclaws are an unusual feature in this genus.

Female 146 μ -185 μ long, 40 μ -47 μ thick, subspindleform; body color in life probably dull yellowish. Rostrum 21 μ long, projecting diagonally down; ant-apical seta 3 μ long. Shield 32 μ long, 36 μ wide, subtriangular; anterior lobe over rostrum somewhat acuminate and slightly apically upcurved. Median shield line nearly complete, strongly sinuate; admedian lines from sides of anterior lobe, gradually diverging to rear shield margin; submedian line from base of anterior lobe on each side, somewhat sinuate and extending back toward rear lateral area but recurving and ending just ahead of dorsal tubercle on the inner side. Shield laterally with two longitudinal lines above coxae, the lines somewhat granular. Dorsal tubercles 21 μ apart, on rear margin; dorsal setae 18 μ long, projecting divergently to rear. Foreleg 29 μ long; tibia 6.5 μ long, with 8 μ seta from 1/3; tarsus 7 μ long; claw 8 μ long, strongly downcurved; featherclaw 8-rayed. Hindleg 25 μ long, tibia 5 μ long, tarsus 6 μ long, claw 8.5 μ long. Coxae, especially anterior coxae somewhat granular; sternal line between coxae strong but short, ending opposite second setiferous tubercles; first coxal setiferous tubercles farther apart than second and slightly ahead of anterior end of sternal line; second coxal tubercles ahead of level of third tubercles. Thanosome with about 55 rings, slight increase ventrad; microtubercles beadlike, lying against ring margins, the ring granules fainter dorsally to rear but laterally pointed over margins. Lateral seta 22 μ long, on ring 9 behind shield first lateral seta 44 μ long, on ring 20; second ventral seta 46 μ long, on ring 36. Telosome 6-ringed, the rings generally microtuberculate with these structures slightly pointed over margins and somewhat extended anteriorly as fine streaks. Telosomal seta 20 μ long. Accessory seta 3 μ long. Female genitalia large, 21 μ wide, 11 μ long; coverflap with about 13 longitudinal ribs; seta 30 μ long.

Male 145 μ -175 μ long.

Type locality: Cunnamulla, Queensland

Collected: January 18, 1971, by W. A. Smith, and sent to me by Dr. A. R. Brimblecombe of the Department of Primary Industries

Host: Bassia birchii F. Muell. (Chenopodiaceae) Galvanized Burr

Relation to host: the mites cause abnormal growth or brooming

Type material: a type slide, sent to Dr. Brimblecombe
a paratype slide sent to the Entomology Research Division
ARS, USDA, Beltsville, Maryland
two paratype slide retained and two vials of mites in liquid

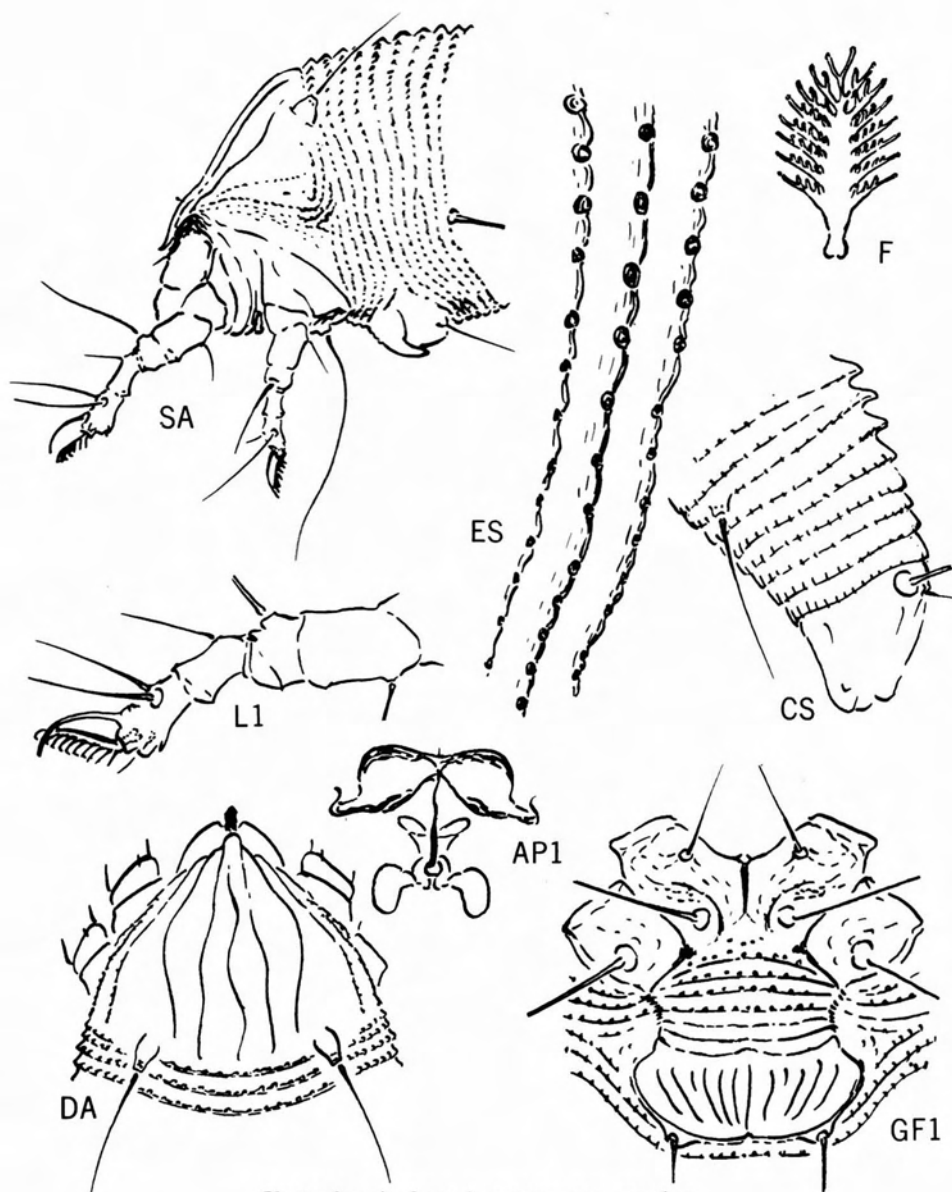


Plate 2 - *Aculops bassiae*, new species

Aculops verapasi Keifer, new species

Plate 3

The principal distinguishing features of this species are the comparatively large spines that project from the margins of each thanosomal tergite and, sternite, plus the 6-rayed featherclaws.

Female 170 μ -185 μ long, 50 μ -56 μ thick, fusiform; color in life probably dull yellowish. Rostrum 24 μ long, curved down; antapical rostral seta 8 μ long. Shield 44 μ long, 50 μ wide; short somewhat upturned shield lobe over rostrum, the lobe acuminate. Shield design a network, with spaces between lines or ridges somewhat concave; shield ridges tending to be rather wide; shield laterally with a longitudinal line above coxae and some spines at rear lateral angle. Dorsal tubercles 28 μ apart, somewhat extended; dorsal setae 25 μ long, projecting out and up. Foreleg 38 μ long; tibia 8 μ long, with 5 μ seta at 1/3; tarsus 7 μ long; claw 9 μ long, rather slender; featherclaw 6-rayed. Hindleg 33 μ long, tibia 6 μ long, tarsus 8 μ long, claw 10 μ long. Coxae set with granules or spinules, most of ornamentation on forecoxae of spinules. Sternal line extending back to second tubercles, slightly forked. First setiferous tubercles farther apart than second and opposite anterior end of sternal line. Second tubercles slightly ahead of third tubercles. Thanosome with about 25 tergites and 50-55 sternites; microtubercles present as prominent spines, especially dorsally, the spines projecting from ring margins. Lateral seta 31 μ long, on sternite 8 behind shield; first ventral seta 65 μ long, on sternite 22; second ventral 16 μ long, on sternite 35. Telosome with 5 rings, the microtubercles fine and somewhat elongate, projecting over ring margins as spinules; telosomal seta 20 μ long. Accessory seta 4 μ long. Female genitalia 24 μ wide, 13 μ long, coverflap with basal granules and about 8 to ten weak longitudinal ribs. Female genital seta 30 μ long.

Male 120 μ -145 μ long.

Type locality: Patal, Baja Verapas, Guatemala

Collected: Mar. 3, 1945, by A. J. Sharp, and sent by Dr. R. H. Richens, Commonwealth Bureau of Plant Breeding and Genetics, Cambridge, England

Host: Ulmus mexicana Planch, the mites being leaf vagrants

Type material: a type slide so designated with the above data sent to Dr. Richens a paratype slide, sent to Agricultural Research Service, Beltsville, Maryland dry leaf from which the slides were made.

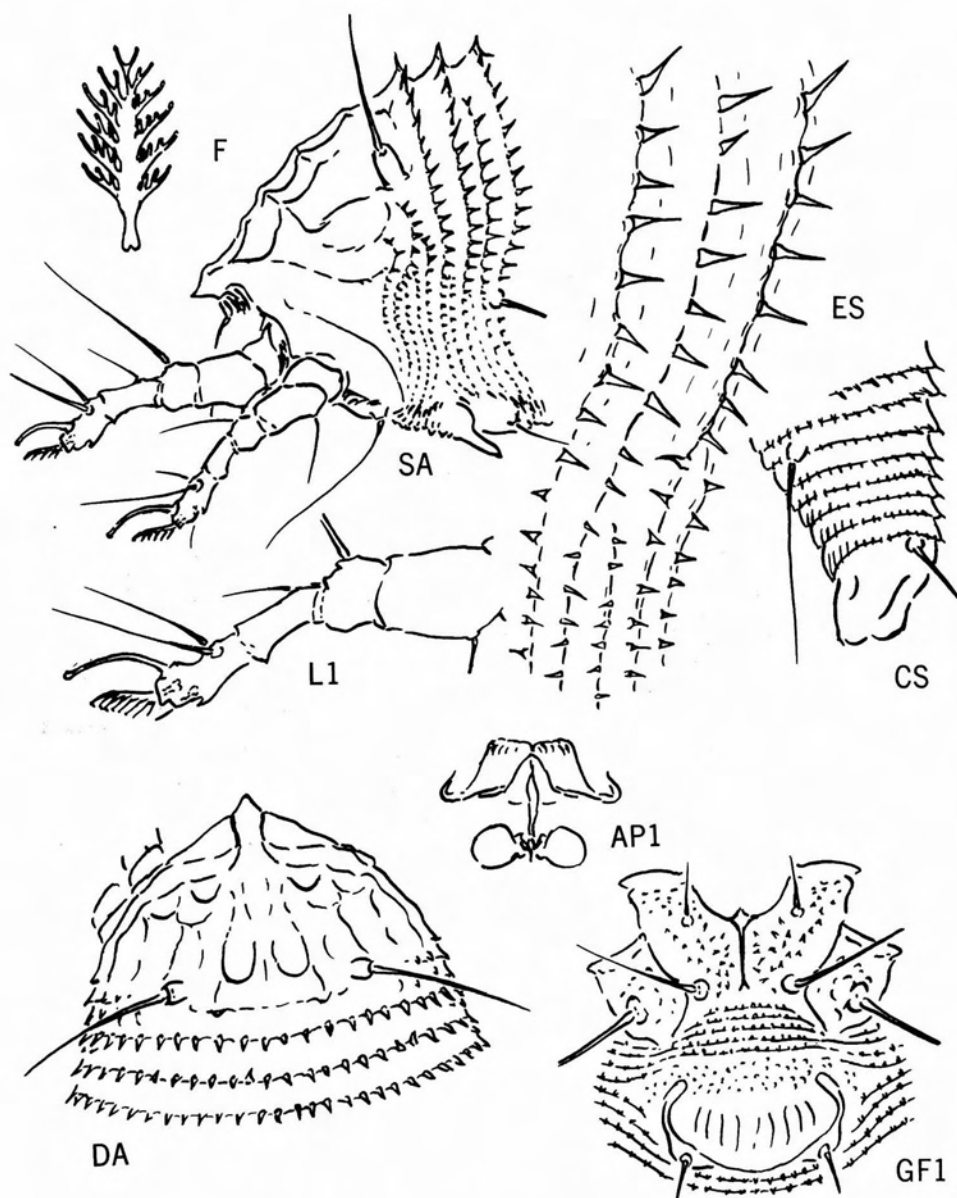


Plate 3 - *Aculops verapasi*, new species

Aculops pentstemonis Keifer, new species

Plate 4

The features of this species are the design-less shield, the small bead-like microtubercles on rings, the thin anterior lobe over rostrum, and the 4-rayed featherclaw. A review of *Aculops* spp. with 4-rayed featherclaws and little or no shield design, does not produce much in the way of species that could be close to *pentstemonis*. Perhaps *Aculops parapycnanthemi* (K.), which lacks a shield pattern and has 4-rayed featherclaws might be similar in some respects, although this species (which may be a deutogyne) has definitely larger microtubercles than those on *pentstemonis*. The new species is a former leaf vagrant that has reentered a microenvironment.

Female 145 μ -172 μ long, 52 μ thick; stocky and wormlike; color dull light amber. Rostrum 28 μ long, projecting down; antapical seta 6 μ long. Shield 38 μ long, 46 μ -50 μ wide, subtriangular in anterior outline, the anterior lobe projecting some distance over rostrum but thin in lateral view. Shield lacking lines or design, some lateral granular bands, and partial rings below dorsal tubercles. Dorsal tubercles 24 μ apart; dorsal setae 21 μ long, projecting backward divergently. Foreleg 29 μ long; tibia 7 μ long, with 7 μ seta at 1/3; tarsus 7 μ long; claw 7.5 μ -8 μ long; featherclaw 4-rayed. Hindleg 27 μ long, tibia 5 μ long, tarsus 6.5 μ long, claw 7.5 μ long. Coxae ornamented with short curved lines and granules, a heavier line curving around inner side of second tubercles; sternal line of moderate length, slightly forking between second tubercles. First setiferous coxal tubercles slightly farther apart than second and a little behind anterior end of sternal line; second coxal tubercles ahead of third tubercles. Thanosome with about 52 rings, completely microtuberculate; microtubercles beadlike on ring margins, those toward ventral rear becoming more pointed over margins, those on dorsal rear becoming fainter. Lateral seta 21 μ long, on ring 8 behind shield; first ventral seta 52 μ long, on ring 19; second ventral seta 15 μ long, on ring 34. Telosome with 5 rings, completely microtuberculate, these microtubercles fine, elongate, and pointed over margins. Telosomal seta 25 μ long. Accessory seta 4 μ long. Female genitalia 21 μ wide, 12 μ long; coverflap basally with about three transverse lines of granules, the main part of coverflap with 12 to 14 longitudinal ribs. Genital seta 22 μ long.

Male about 160 μ long.

Type locality: Twin Bridges, El Dorado County, Cal., about 6000 ft. elev.

Collected: July 30, 1966, by the writer

Host: *Pentstemon newberryi* Gray (Scrophulariaceae) beard tongue

Relation to host: the mites form colonies within petiole bases around terminals, and cause tissue browning and shrinking.

Type material: a type slide, so designated, sent to Entomology Research Division, USDA, Beltsville, Maryland
four paratype slides retained by the writer

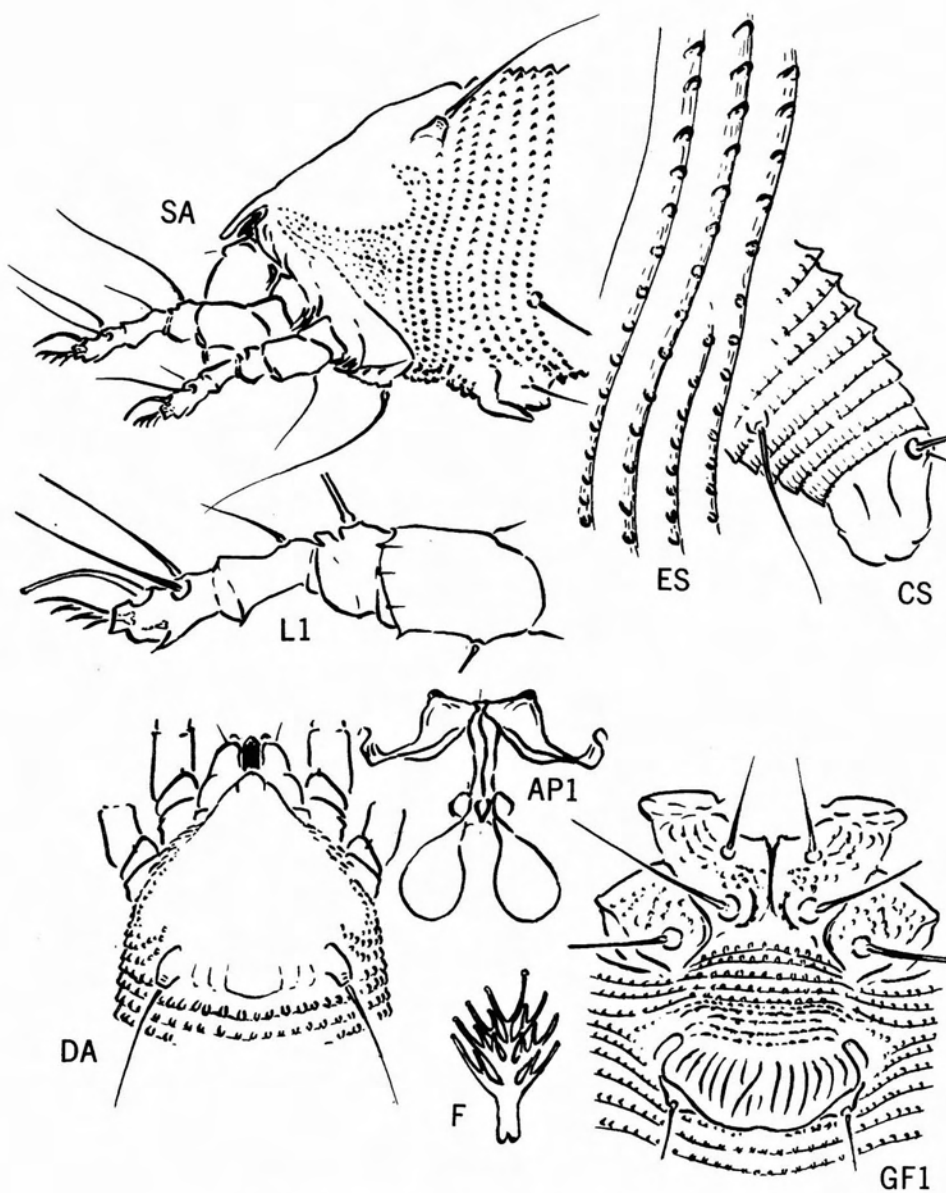


Plate 4 - *Aculops pentstemonis*, new species

Epitrimerus rainierellus Keifer, new species

Plate 5

This species has 7-rayed featherclaws, and a search of species in this genus fails to disclose any others with that character. Several species on conifers have 6-rayed featherclaws. The new species has granular lines on the cephalothoracic shield, and the anterior lobe over the rostrum has three small points projecting forward.

Female 156 μ -204 μ long, 45 μ -52 μ thick, 60 μ wide; fusiform in shape; color in life whitish. Rostrum 23 μ long, projecting down; antapical seta 5 μ long. Shield 41 μ long, 46 μ wide. Shield subtriangular with anterior lobe somewhat convex laterally, this lobe with three small forward pointing spinules. Shield design of lines with granules: median line present only just ahead of rear shield margin; admedian lines with fewer granules anteriorly, curving back from sides of front of anterior lobe, running straight back to area between dorsal tubercles, then forking, the inner fork going to median line, the outer fork ending close to dorsal tubercle at rear margin. A granular submedian line from side of anterior lobe, meeting a branch from admedian at just before 1/2, then forking in front of dorsal tubercle. Some lateral branched shield lines of granules and a wide band of granules above coxae. Dorsal tubercles 18 μ apart, longitudinal axes, situated just ahead of rear shield margin; dorsal setae 21 μ long, projecting diagonally ahead and inward. Foreleg 31 μ long; tibia 8 μ long, with 6 μ seta at 1/3; tarsus 7 μ long; claw 7 μ long; featherclaw 7-rayed. Hindleg 27 μ long, tibia 6 μ long, tarsus 6 μ long, claw 8 μ long. coxae with few lines on surfaces, anterior coxae rather widespread; sternal line rather heavy, ending just before second tubercles; first setiferous coxal tubercles further apart than second and slightly farther ahead than anterior end of sternal line; second coxal tubercles somewhat ahead of third. Thanosome with 45 to 50 tergites and 58 to 65 sternites; microtubercles small and beadlike, on ring margins and projecting slightly over margins. Microtubercles becoming more pointed over margins toward thanosomal rear. Subdorsal furrows making central ridge very shallow, but extending nearly entire length of thanosome. Lateral seta 27 μ long, on sternite 6 behind shield; first ventral seta 24 μ long, on sternite 18; second ventral seta 26 μ long, on sternite 39. Telosome with about 5 rings, completely microtuberculate, these structures fine, elongate, and pointed over ring margins, longer ventrally. Telosomal seta 21 μ long. Accessory seta 3 μ long. Female genitalia 20 μ wide, 14 μ long; coverflap basally with two transverse lines of short dashes, main part with 10-12 ribs; seta 17 μ long.

Male about 17 μ long, 60 μ wide, 40 μ thick.

Type locality: Mt. Rainier Park, Washington

Collected: August 10, 1967, by the writer

Host: Sorbus cascadiensis Jones (Rosaceae) mountain ash

Relation to host: the mites are undersurface leaf vagrants

Type material: a type slide, so labelled, sent to Entomology Research Division, USDA, Beltsville, Maryland
four paratype slides of which three are retained and one is sent to Entomology Research Division
a vial of leaves and mites in liquid

Note - the host is sometimes called Sorbus occidentalis.

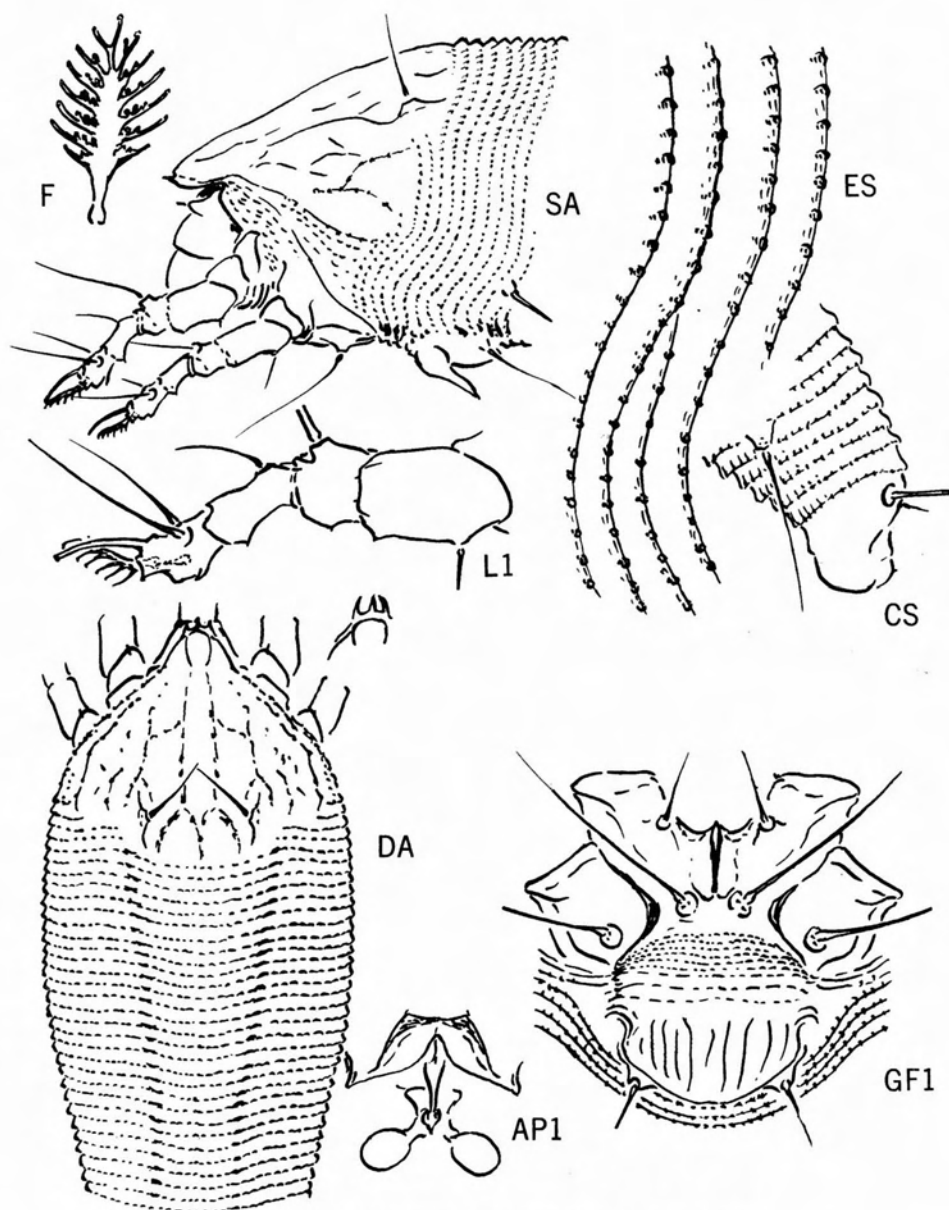


Plate 5 - *Epitrimerus rainierellus*, new species

Calepitrimerus olympici Keifer, new species

Plate 6

This species has a 6-rayed featherclaw, as does *C. arrowi* K. This latter species occurs on *Vaccinium* in Maryland. The new species differs by having a more pronounced shield pattern, and by having elongate microtubercles on the tergites. The weak central thanosomal ridge extends back 25-30 tergites.

Female 170 μ -200 μ long, 46 μ -50 μ thick; fusiform; light yellow in life. Rostrum 21 μ long, projecting down; antapical seta 9 μ long. Shield 46 μ long, 47 μ wide, subtriangular. Anterior shield lobe somewhat convex laterally, with small spinules projecting from under front edge, the numbers of these spinules varying from one to three. Median shield line absent; admedian lines curving back from sides of anterior edge of anterior lobe, recurving outward at anterior lobe base, extending back and gradually diverging toward inner side of dorsal tubercles and slightly recurving at rear margin. Submedian line curving back from sides of anterior shield lobe and joining with dorsal tubercle. Shield with lateral lines and granules. Dorsal tubercles 18 μ apart, with longitudinal axes and a short distance ahead of rear margin; dorsal setae 7 μ long, projecting up and central. Foreleg 29 μ long; tibia 7 μ long, with 7 μ seta at 1/2; tarsus 6 μ long; claw 6.5 μ long; featherclaw 6-rayed. Hindleg 28 μ long, tibia 5 μ long, tarsus 7 μ long, claw 7 μ long. Coxae ornamented with curved lines and granules; sternal line apparently divided and short; first setiferous coxal tubercles farther apart than second and well ahead of anterior end of sternal line; second coxal tubercles nearly as far back as third tubercles. Thanosome with 42-45 tergites, 50-55 sternites; fine but elongate microtubercles on tergites, less prominent to rear; beadlike microtubercles on sternites. Lateral thanosomal seta 27 μ long, on sternite 8 behind shield; first ventral seta 30 μ long, on sternite 20; second ventral seta 34 μ long, on sternite 35. Telosome with six rings, completely microtuberculate, these structures tending to be fine and elongate; seta 28 μ long. Accessory seta 3.5 μ long. Female genitalia preceded by area of fine microtubercles between coxae; genitalia 24 μ wide, 24 μ long; coverflap with faint basal marks and about 8 weak longitudinal ribs; seta 21 μ long.

Type locality: Elwha River area, Olympic Peninsula, Washington

Collected: August 12, 1967, by the writer

Host: *Vaccinium parvifolium* Sm. (Ericaceae) Red huckleberry

Relation to host; the mites are vagrants on both leaf surfaces

Type material: a type slide, sent to Entomology Research Division,
USDA, Beltsville, Maryland
a paratype slide, retained
leaves and mites in liquid

C-4 errata -

page 3 - the specific name of the hostplant is odoratum
not adoratum.

page 21 - read cephaloneus instead of cephalonicus, Fig. 3

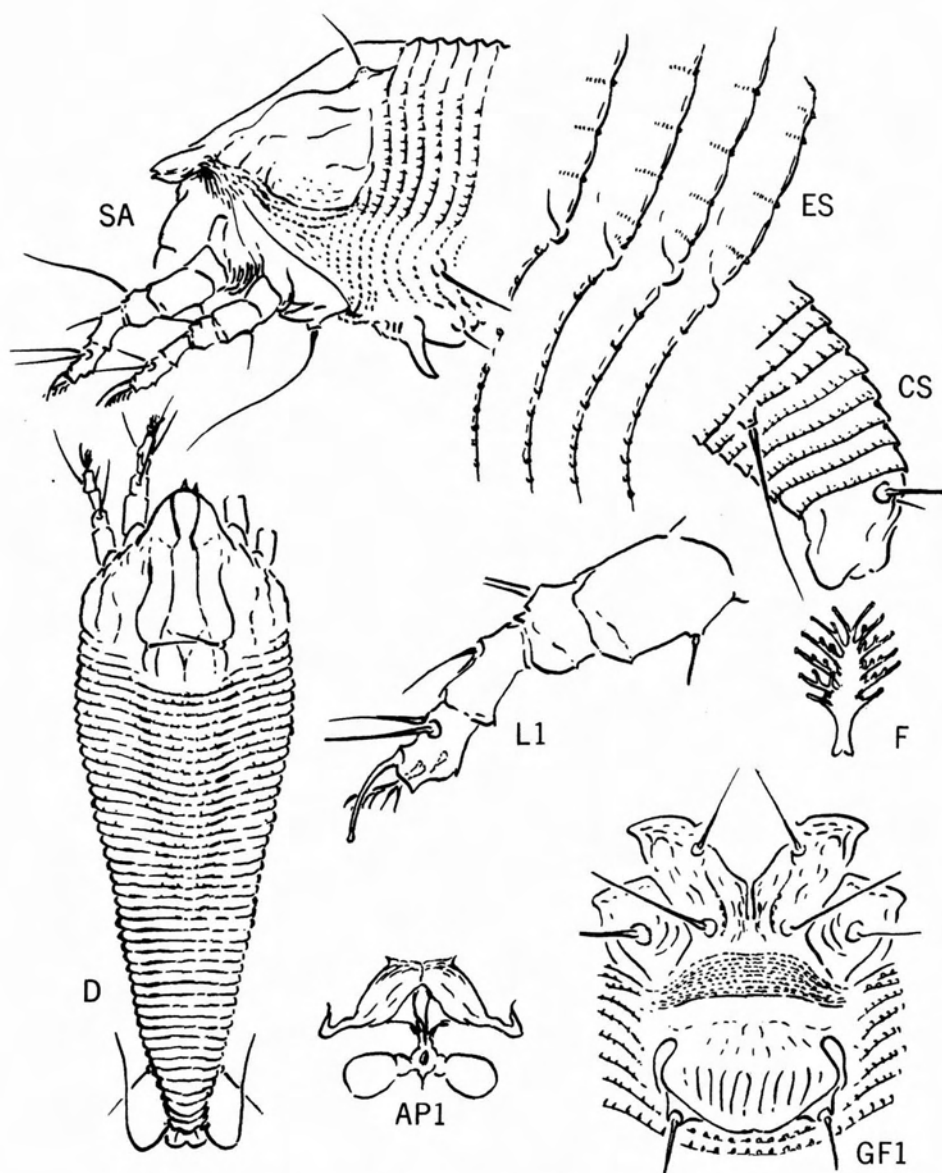


Plate 6 - *Calepitrimerus olympici*, new species

Tetra calamorphae Keifer, new species

Plate 7

The characters of this mite are: 7-rayed featherclaw, orange color, lack of a definite shield pattern, and rather deep transverse groove across front edge of anterior shield lobe. The featherclaw rays on various species in Tetra range from 2 to 8. This is the first to have a 7-rayed empodium, except Tetra americana K., on elm, which has a 6-7 rayed empodium. But this americana has a much more definite shield pattern.

Female 130 μ -150 μ long, 48 μ wide, 40 μ thick; color in life orange; body flattened-fusiform. Rostrum 22 μ long, projecting down; antapical seta 5.5 μ long. Shield 40 μ long, 41 μ wide, triangular in anterior outline, with anterior lobe somewhat convex laterally and with rather deep transverse groove across front edge. Shield pattern obsolete, a faint line extends forward from dorsal tubercles. Dorsal tubercles 19 μ apart; dorsal setae 18 μ -21 μ long. Foreleg 28 μ long; tibia 5.5 μ long, with 8 μ seta at 1/3; tarsus 6 μ long; claw 8 μ long; featherclaw 7-rayed. Hindleg 25 μ long, tibia 5 μ long, tarsus 5 μ long, claw 8.5 μ long. Coxae ornamented with some granules and short curved lines, anterior coxae rather widespaced, the sternal line shortened; first setiferous coxal tubercles opposite anterior end of sternal line and slightly farther apart than second; second setiferous coxal tubercles not much farther ahead of third. Thanosome with about 22 tergites which lack microtubercles. About 50-55 sternites with small microtubercles along margins and extending over as acuminate structures. Lateral seta 17 μ long, on sternite 8; first ventral seta 44 μ long, on sternite 21; second ventral 16 μ long, on sternite 38. Telosome with 4 rings, the microtubercles fine and pointed over margins, these granules fainter dorsally anteriorly. Accessory seta 3 μ long. Female genitalia 19 μ wide, 12 μ long; coverflap basally with two or three granular transverse lines, and with about 12 moderately strong ribs; genital seta 27 μ long.

Type locality: Limekiln Road, Grass Valley district, Nevada County, Cal.

Collected: September 4, 1969, by the writer

Host: Amorpha californica var napensis Jepson (Leguminosae) false indigo

Relation to host: the mites are leaf vagrants, mostly on the undersurfaces

Type material: a type slide, so designated, and sent to the Entomology Research Division, USDA, Beltsville, Maryland
five paratype slides, four retained, and one sent to the Entomology Research Division.

Designations on Plates

- API - Internal female genital structures
- CS - Lateral caudal section of mite
- D - Dorsal diagram of mite
- DA - Dorsal diagram of anterior section
- ES - Lateral skin structures
- F - Empodium or featherclaw F1- on first leg; F2- on second leg
- GPI - External female genitalia and coxae from below
- L1 - Left anterior leg
- L2 - Left second leg
- S - Diagram of side of mite
- SA - Anterior view of side of mite

Telosome - caudal section of mite including third ventral or telosomal seta

Thanosome - abdomen from rear shield margin to telosome

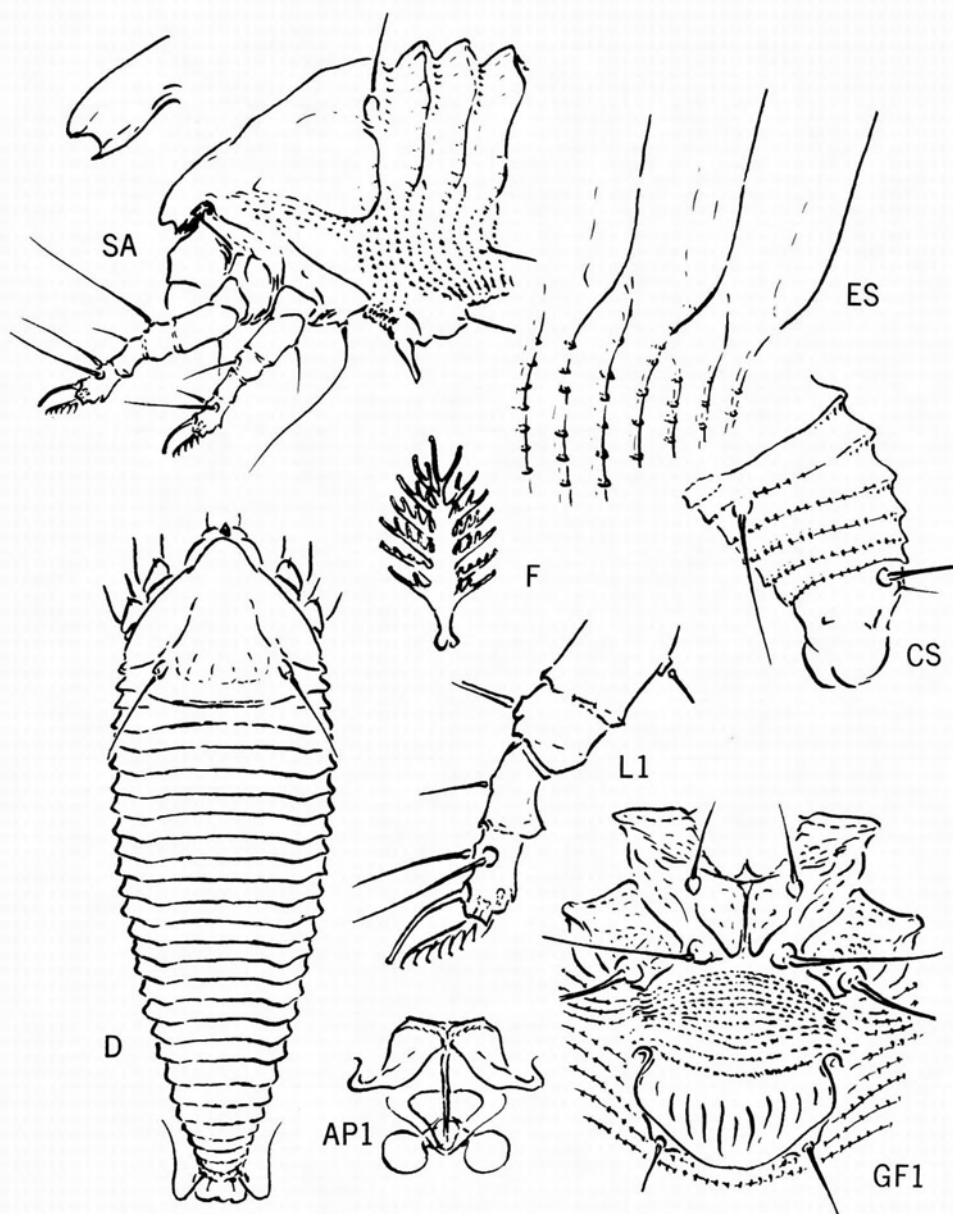


Plate 7 - *Tetra calamorphae*, new species